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PATENT

SPECIFICATION

*Convention Date (Belgium), July 16, 1914.**Application Date (in the United Kingdom), Nov. 29, 1919. No. 29,829/19.**Complete Accepted, Mar 4, 1920.*

## COMPLETE SPECIFICATION.

**Automatic Variable Speed Gear for Automobile Vehicles Acting as an Automatic Clutch and Differential Gear.**

I, RENE TONDEUR, formerly of 30, rue de Grand Jour, Mons, Belgium, but now of 6, rue Thouin, Paris, France, Engineer Student, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

5 This invention relates to automatic variable speed gear for automobile vehicles, which is of the type in which expanding pulleys driven by belts are operated or adjusted by means of centrifugal force. The invention consists in an improved construction and arrangement of parts according to which the movable members of two expanding pulleys, components of two separate 10 sets of pulleys, one on each side of the vehicle, are connected by means of a single centrifugal device or governor acting simultaneously on them, the action of the device being counteracted by a single resisting device. Moreover, the said movable members together with the connecting centrifugal and 15 resisting devices are capable as a whole of longitudinal displacement with respect to the fixed pulley members connecting with the vehicle driving gear, thereby constituting a balance gear.

The invention will be described with reference to the accompanying drawing in which Fig. 1 is an elevation showing one expanding pulley, of each of the two sets of pulleys, the centrifugal operating and resisting devices and other member, the parts of one of the pulleys being shown in section, the section plane being indicated by the line  $x - y$  in Fig. 2, which is a cross sectional view of the arrangement in Fig. 1.

In the drawing O is a steel tube which has extensions forming hollow cylindrical shafts, mounted on ball or roller bearings R, carried by supporting 25 members S, fixed to the frame of the vehicle. A  $A_1$  denotes the fixed and movable parts of the two pulleys. The parts A of the pulleys are screwed on the ends of said shafts. In the tube O the sliding members K are held apart by a spring  $\tau_1$ .

Holes f correspond with apertures a provided in the tube. The sliding 30 members K are rigidly connected, by means of rods t, with the external parts  $A_1$  of the pulleys, which are made to receive belts G of trapezoidal sec-

[Price 6d.]

tion. The parts  $A_1$ , are adapted to slide longitudinally on hubs provided on the parts A, the rotation of the one part with respect to the other being prevented by studs E engaging corresponding holes drilled in the hub of the part A. Slidably mounted on the tube O are two oppositely disposed collars D and the sliding members K are connected with the collars D by means of pins 5 or parts projecting laterally from said members and passing through elongated slots  $a$  in the tube O, extend into holes f provided in the collars D.

A suitable driving gear L, such as a pulley or toothed wheel, driven from the motor of the vehicle is fixed to tube O.

The collars D are connected with one another by means of pairs of rods b. 10 The two rods forming a pair being each pivotally attached at one end to a collar D, and at the other end to a heavy jointing or connecting device B. The two devices B are symmetrically disposed with respect to the axis of the tube O.

A guide member is shown C for controlling the movement of the rods b; it is fixed by means of a screw C' or other suitable means to the tube O. In Fig. 1 a face view of the guide is depicted to the right of and adjacent to the fixing screw C'.

The centrifugal system B, b, D, is thus connected, by the device f, K, t, to the external parts A<sup>1</sup> of the pulleys. The spring  $r_1$  maintains the centrifugal system out of action as long as the rotating speed of the system is that corresponding to "slow" speed.

As soon as the speed increases, the masses B B are spread apart under the action of centrifugal force so that D D are displaced toward each other, as well as the parts A<sup>1</sup> A<sup>1</sup>, this resulting in a wedging or automatic clutching of 25 the belts G G between the fixed and movable parts A, A<sup>1</sup>, of the respective pulleys. At first the driving radius is a minimum, and the resisting stress is a maximum. As soon as the vehicle has started, the resisting stress decreases; as the belt acts as a wedge, and tends to spread the pulleys apart the stress resulting from this action decreases while the speed of the motor tends to increase, the pulleys having a tendency to draw nearer to each other. Under these two combined actions, the belts rise on their respective pulleys so as to maintain a balance resulting in a constant speed of the motor.

The set of parts drawn in strong lines in Fig. 1 is independent from that drawn in thin lines. As soon as the right hand belt, for instance, tends to transmit a greater stress, as in turning, the resulting stress for spreading apart the jaw A, A<sup>1</sup> of the right hand pulley increases, whilst it decreases for the left hand pulley, so that the set of parts drawn in strong lines is moved to the right until the balance is obtained, a differential gear being thus obtained.

Ball bearings r co-operating with the parts A of the pulleys reduce friction almost to nothing when the clutch is disengaged; the guide C prevents any distortion of the centrifugal system. The dimensions of the several parts are calculated for each particular case and vary according to the machine and the maximum speeds to be obtained.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Automatic variable speed gear of the kind referred to in which the movable members of two expanding pulleys components of two separate sets of pulleys are connected by means of a single centrifugal device acting simultaneously on them, and the action of said device is counteracted by a single resisting device.

2. Automatic variable speed gear as claimed in Claim 1, in which the two movable pulley members together with the connecting and resisting devices are capable as a whole of longitudinal displacement with respect to the fixed pulley members, thereby constituting a balance gear.

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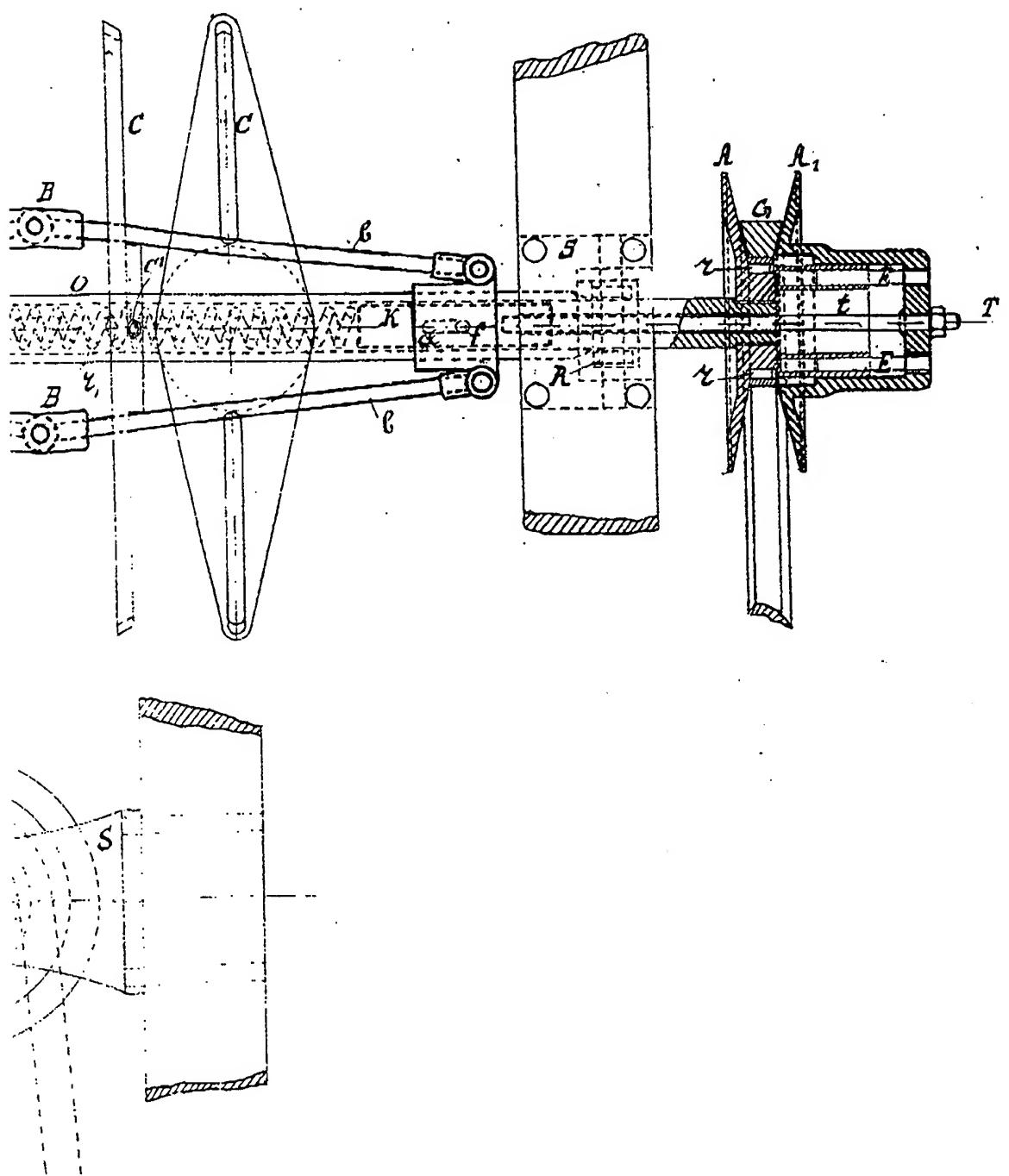
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3. Automatic variable speed gear according to Claim 1, in which the pulley centrifugal controlling device is constructed and operating substantially as described with reference to the accompanying drawing.

Dated this 29th day of November, 1919.

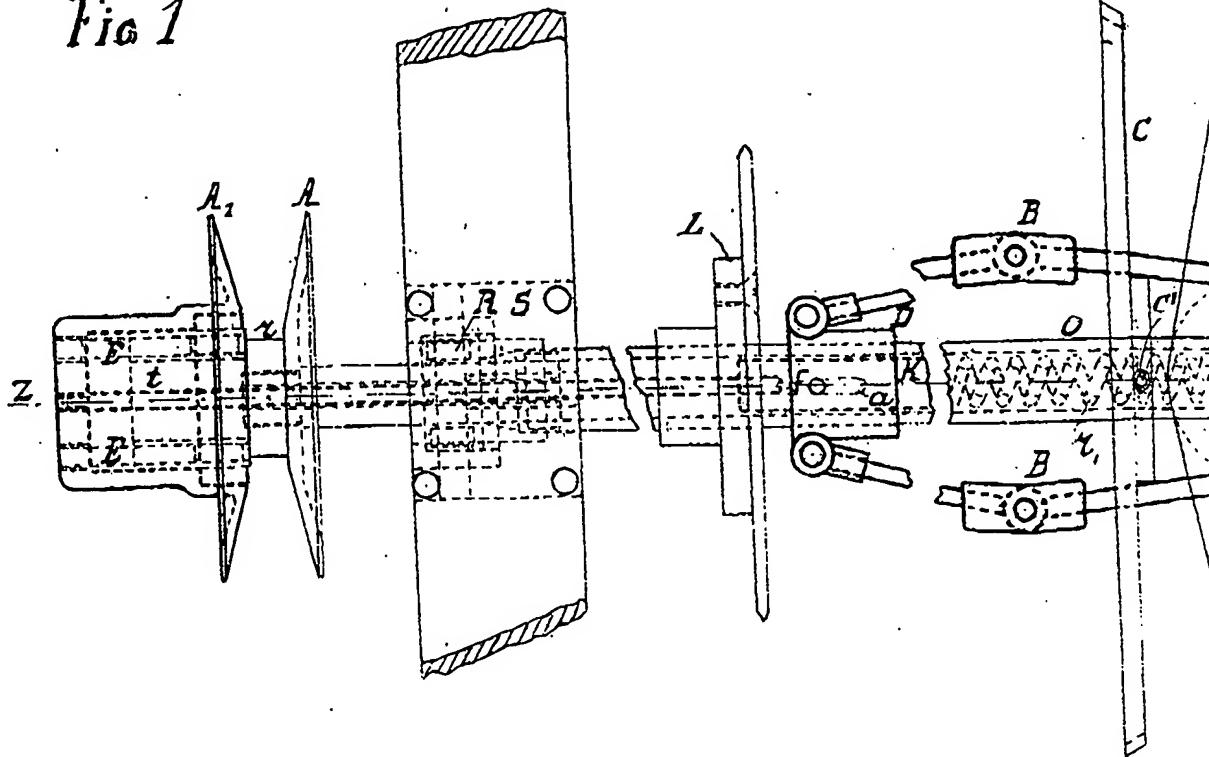
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Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1920.



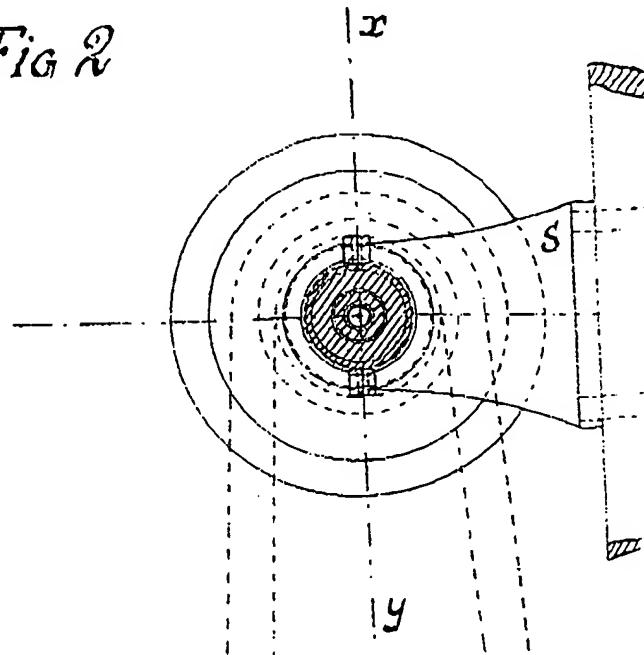
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Fig 1



[This Drawing is a reproduction of the Original on a reduced scale]

Fig 2



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